

10/010,607



6.

10/010,607

CLAIMS

What is claimed is:

1. A single use hypodermic syringe with a retracting needle system comprising:
 - a cylindrical body element for containing a fluid;
 - a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and a pre-use and post-use position wherein the needle is retracted and contained completely within the body element;
 - a plunger rod reciprocally received into the body element forming a fluid chamber therebetween, and whereby positive and negative pressure forces are generated by adjustment of the plunger rod within the body element whereby fluid is drawn into, and expelled from, the body element through the hollow needle;
 - a retraction mechanism comprising:
 - the springs between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial pressure on the needle holding member;
 - at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial pressure of the springs;
 - at least one activating member within the needle holding member responding to positive fluid pressure within the fluid chamber to release the retaining member from the needle holding member;
 - whereby the needle is automatically deployed into the injecting position by depression of the plunger rod prior to drawing fluid into the fluid chamber and is automatically retracted within the body element at the completion of an injection stroke of the plunger rod and which retraction renders the syringe safe for handling and disposal.
2. The hypodermic syringe of claim 1 wherein said activating member comprises an activating ring with pistons attached cooperating with an activating release slide, whereby positive fluid pressure within the fluid chamber pushes the activating ring piston against the activating release slide which in turn releases the retaining clip from the needle holding member.

10/010,607

7.

10/010,607

3. The hypodermic syringe of claim 1 wherein the springs are conical helical springs.
4. The hypodermic syringe of claim 3 wherein the springs are twin conical helical springs.
5. The hypodermic syringe of claim 4 wherein the twin conical helical springs includes a spring separation member.
6. The hypodermic syringe of claim 1, wherein the springs are received between a pair of spring retaining cups.
7. The hypodermic syringe of claim 6 wherein one of spring retaining cups is integrally formed with the needle holding member.
8. The hypodermic syringe of claim 1, wherein a plurality of activation members are equidistantly spaced around the needle holding member, each activation member cooperating with a corresponding retaining member.
9. The hypodermic syringe of claim 8 wherein a slide member is located between each activation member and each corresponding retaining member.
10. A single use hypodermic syringe with a retracting needle system comprising:
a cylindrical body element for containing a fluid;
a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and a pre-use and post-use position wherein the needle is retracted and contained completely within the body element;
a plunger rod reciprocally received into the body element forming a fluid chamber there between, and whereby positive and negative pressure forces are generated by adjustment of the plunger rod within the body element whereby fluid is drawn into, and expelled from, the body element through the hollow needle;
a retraction mechanism comprising:
the springs between the needle holding member and the axial end of the cylindrical

10/010,607

8.

10/010,607

body element through which the needle member projects and which generates an axial pressure on the needle holding member, wherein the springs are twin conical helical springs and include a spring separation member and is received between a pair of spring retaining cups, both spring retaining cups being integrally formed with the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial pressure of the springs;

a plurality of activating members within the needle holding member equidistantly spaced around the needle holding member moulded on a ring, responding to positive fluid pressure within the fluid chamber to release a corresponding retaining member from the needle holding member, and a slide member located between each activation member and each corresponding retaining member;

whereby the needle is automatically deployed into the injecting position by depression of the plunger rod prior to drawing fluid into the fluid chamber and is automatically retracted within the body element at the completion of an injection stroke of the plunger rod and which retraction renders the syringe safe for handling and disposal.

11. A needle retraction mechanism for a single use hypodermic syringe having a cylindrical body element for containing a fluid and a plunger rod reciprocally received into the body element forming a fluid chamber therebetween, and whereby positive and negative pressure forces are generated by adjustment of the plunger rod within the body element whereby fluid is drawn into, and expelled from, the body element through the hollow needle, comprising:

a needle assembly comprising a needle holding member and a hollow needle, the needle holding member repositionable between an injecting position wherein the needle projects axially outward from the body element and post-use position wherein the needle is retracted and contained completely within the body element;

the springs between the needle holding member and the axial end of the cylindrical body element through which the needle member projects and which generates an axial pressure on the needle holding member;

at least one retaining member engaging the needle holding member and retaining the needle holding member against the axial pressure of the springs;

at least one activating member within the needle holding member responding to positive fluid pressure within the fluid chamber to release the retaining member from the needle holding member.

10/010,607

9.

10/010,607

12. The needle retraction mechanism of claim 11 wherein said activating member comprises an activating ring piston cooperating with an activating release slide, whereby

positive fluid pressure within the fluid chamber pushes the activating ring piston against the activating release slide which in turn releases the retaining clip from the needle holding member.

13. The needle retraction mechanism of claim 11 wherein the springs are conical helical springs.

14. The needle retraction mechanism of claim 13 wherein the springs are twin conical helical springs.

15. The needle retraction mechanism of claim 14 wherein the twin conical helical springs includes a spring separation member.

16. The needle retraction mechanism of claim 11 wherein the springs are received between a pair of spring retaining cups.

17. The needle retraction mechanism of claim 16 wherein both spring retaining cups are integrally formed with the needle holding member.

18. The needle retraction mechanism of claim 11 wherein a plurality of activation members are equidistantly spaced around the needle holding member moulded on a ring, the activation member cooperating with a corresponding retaining member.

19. The hypodermic syringe of claim 18 wherein a slide member is located between each activation member and each corresponding retaining member.